SHORT CASES IN CARDIOLOGY

Right sided pectoral implantation of an "active can" transvenous implantable cardioverter-defibrillator with single right ventricular lead

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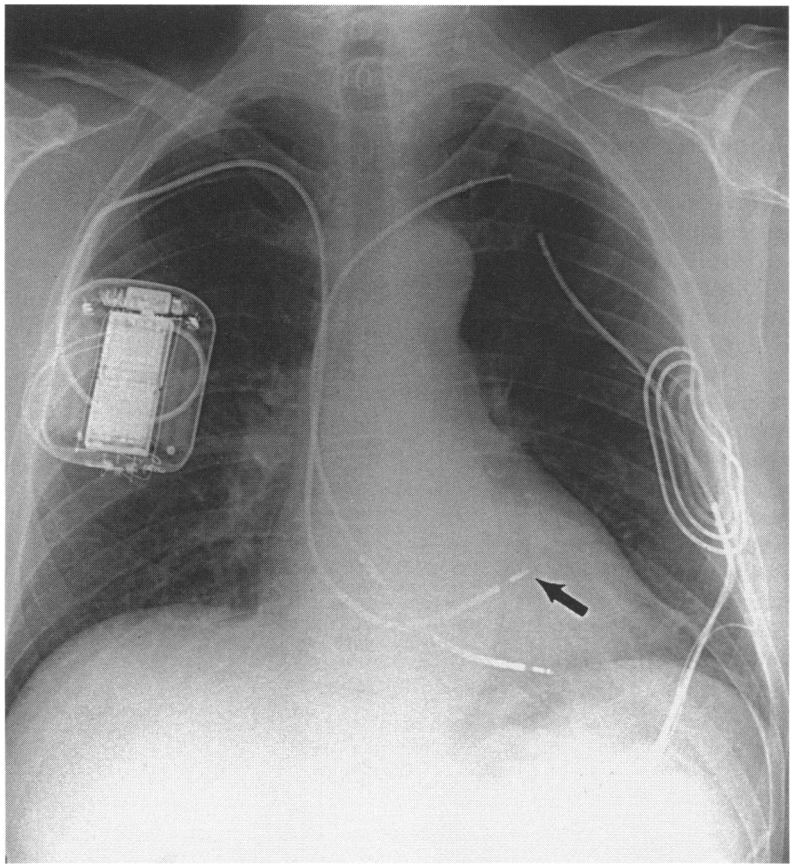
A 63 year old man with a transvenous cardioverter-defibrillator, implanted in the rectus sheath, sustained a partial fracture of the right ventricular lead. We decided to replace the system with a pectoral "active can" device (Medtronic Jewel model 7219C) with a single tripolar ventricular lead. Attempts to remove the old right ventricular lead failed. We were unable to pass a guide wire to the superior vena cava and thought that the left subclavian vein was occluded. We resorted to a right subclavian vein approach, placing the lead in the body of the right ventricle (figure).



Posterior-anterior chest radiograph showing position of device in the right pectoral region. The arrow shows the distal end of the new right ventricular lead above the old, fractured, right ventricular lead.

With a temporary "active can emulator" in the right pectoral region, the system terminated ventricular fibrillation, first at 24 J and then at 18 J. The defibrillation threshold one week later was satisfactory at <34 J with a defibrillation impedance of 55 Ω.

Recent reports have shown the efficacy of third generation transvenous implantable cardioverter defibrillators.[1 2] The system we used consists of a single tripolar right ventricular lead with the cover of the device acting as the anode. The manufacturers recommend that the device is implanted in the left pectoral region to facilitate the spread of the defibrillation wave across both the right and left ventricles. In our patient left sided implantation was precluded. However, defibrillation thresholds were satisfactory with the system implanted on the right side even though the vector between the cathode and anode predominantly passed through the right ventricle. The position of the right ventricular lead within the ventricle may be important. The figure shows that the new right ventricular lead is positioned away from the apex. This configuration may allow capture of more of the myocardium than an electrode placed at the right ventricular apex and so increase the probability of capturing enough myocardium[3] to restore sinus rhythm.

The feasibility of implantation of right sided "active can" system has not to the best of our knowledge been reported before.

1 Brachman NJ, Sterns L, Hilbel T, Schoels W, Beyer T, Mehmanesh H, *et al.* Acute efficacy and chronic follow-up of patients with non-thoracotomy third generation implantable defibrillators. *PACE* 1994;17:499–505.
2 Fitzpatrick AP, Lesh MD, Epstein LM, Lee RJ, Siu A, Merrick S, *et al.* Electrophysiology laboratory, electrophysiologist-implanted, non-thoracotomy-implantable cardioverter defibrillators. *Circulation* 1994;89:2503–8.
3 Zipes DP, Fisher J, King RM, Nicoll A de B, Jolly WW. Termination of ventricular fibrillation in dogs by depolarizing a critical amount of myocardium. *Am J Cardiol* 1975;36:37–44.